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FOUNTAIN PEN DESK SET

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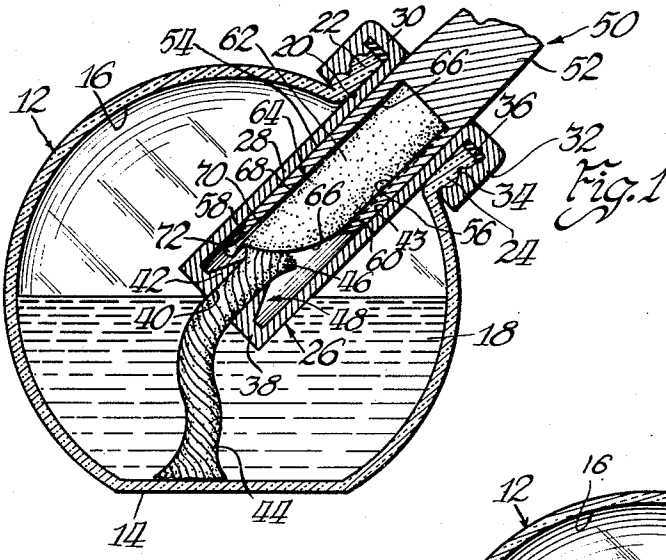

Fig. 1

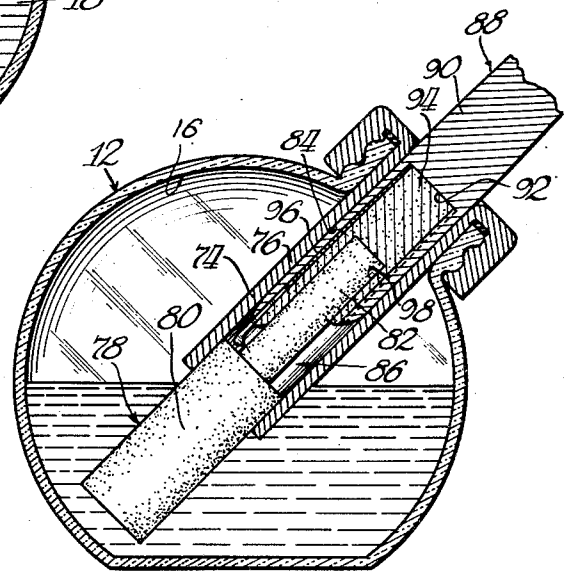

Fig. 2

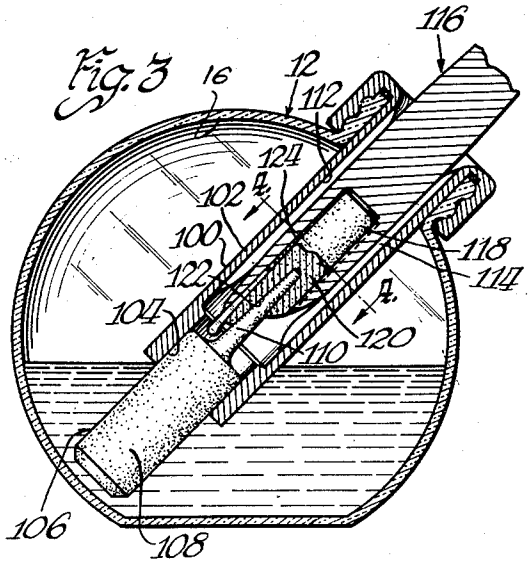

Fig. 3

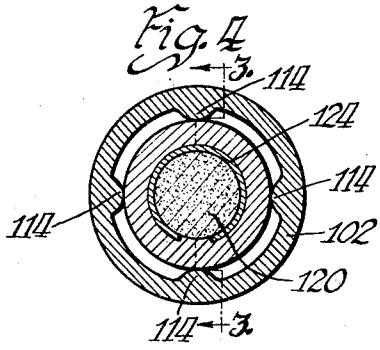

Fig. 4

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FOUNTAIN PEN DESK SET

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2 Claims. (Cl. 120—57)

The present invention relates to pen desk sets. It has to do more particularly with pen desk sets of the capillary type including a pen and a receptacle or so-called "base" for receiving and supporting the pen when the pen is not in use in writing, in which the pen and base each has a capillary element arranged so that when the pen is in the base it is filled with ink by capillary action and when the pen is removed from the base the ink is retained in the pen by capillary action except in a writing operation when the ink flows out of the pen by capillary action onto the writing surface.

In desk sets of this general class that were heretofore known, it was necessary that the pen be inserted in the base in a predetermined position relatively to its longitudinal axis in order that the capillary elements of the pen and base be in proper ink feeding interengagement, with the obvious resultant disadvantages.

An object therefore of the present invention is the provision of a pen desk set of novel construction that obviates the objection to previously known sets as noted above.

Another object is the provision of a capillary pen desk set of the character referred to, of such construction as to enable placement of the pen in the base in any angular position of the pen, with full capillary engagement between the capillary units in the base and pen.

Still another object is the provision of a capillary pen desk set of the character referred to, in which the capillary elements in the base and pen have relatively large contact surfaces for mutual engagement for enabling rapid filling of the pen by capillary action when the pen is in place in the base.

Other objects of the invention will be apparent upon reference to the following detailed description taken in conjunction with the accompanying drawing, in which:

Figure 1 is a fragmentary vertical sectional view of a pen desk set constituting one form of the present invention, with the outer portion of the pen omitted;

Fig. 2 is a view similar to Fig. 1 showing another form of the invention;

Fig. 3 is also a view similar to Fig. 1 showing a third form of the invention, but with the pen shown in a sectional view taken on staggered line 3—3 of Fig. 4; and

Fig. 4 is an enlarged sectional view taken on line 4—4 of Fig. 3.

In each of the forms of the invention illustrated the pen desk set includes a base having a reservoir or well for containing ink, a socket in which the pen is inserted when the pen is not in use, and a capillary ink lifting element for lifting the ink from the reservoir to the pen. The pen includes a capillary ink storage element which contacts the ink lifting element in capillary engagement therewith so that the ink feeds from the base to the ink storage element in the pen. The pen may be inserted in the socket in the base in a normal manner similar to that in inserting a conventional type pen in a pen holder

in a base. When the pen is removed from the base and utilized in writing, the ink stored in the pen is drawn out by capillary action and deposited on the writing surface.

The invention is particularly adapted for use in a capillary dip pen, but it may also be applied to a capillary fountain pen having a capillary element for lifting and storing ink and allowing the ink to be written out, and having the capacity of an ordinary fountain pen.

The desk set illustrated in Fig. 1 includes a base **12** constituting a reservoir member or well **16** which may be of spherical contour throughout the greater portion of its surface and have a flat bottom surface **14** for engaging a supporting surface and maintaining the base in the upright position. The particular shape of the reservoir member **16** of course may be varied and need not be generally spherical but may assume other shapes. The reservoir member **16** may be made of glass, as indicated in the drawing, or other desired material that is impervious to the action of the ink. The reservoir **16** is adapted for containing a quantity of ink **18** and in the normal usage of the set the ink level will preferably be at about that illustrated so as not to be disposed above the lower end of the pen when the latter is inserted in the base, as will be referred to later. The reservoir member **16** is provided with an opening **20** surrounded by an outwardly extending tubular neck portion **22** having external threads **24** for securement of the pen retainer **26** to be presently described. The opening **20** is of course disposed above the desired normal level of the ink, but it is preferably displaced from the top of the base so as to be directed outwardly at an inclined angle for ease in insertion of the pen by the user, e. g., when the pen is held in a normal writing position.

The pen retainer **26**, composed of desired material such as metal or plastic, includes a tubular element **28** which in the assembled base is disposed and mounted in the opening **20** and extends into the reservoir an appreciable distance. The outer diameter of the tubular element **28** is preferably of such dimension as to snugly fit the inner surface of the neck **22** to aid in maintaining the pen retainer rigidly in position in the base. The outer end of the tubular element **28** terminates in a radial flange **30** merging into an annular axially extending flange **32** having internal threads **34** for engaging the threads **24**, whereupon the tubular element may be threaded down on the neck **22**, the flange **30** engaging a resilient gasket **36** interposed between the flange and the neck for sealing the interior of the reservoir member against the outflow of ink at that point. The gasket **36** may be of any desired material having the desired resiliency effective for sealing purposes, one example of material being "Neoprene."

The inner end of the tubular element **28** has an end wall portion **38** provided with a central aperture **40** of appreciably lesser diameter than the inner diameter of the tubular element, and disposed coaxial with the tubular element. The aperture **40** is surrounded by an annular boss **42** of frusto-conical outer surface with its smaller end extending outwardly from the inner end of the pen retainer **26**. The boss **42**, it will be noted, is of small dimension relative to the tubular element **28** in the direction axially of the latter. The outer portion of the tubular element constitutes a socket **43** for receiving the forward end of the pen, as will be described later.

The capillary ink lifting element **44** in the present instance takes the form of a resilient wick which may be made of any of a number of materials, such for example as absorbent wicking, effective for lifting the ink by capillary action from the reservoir to its upper end. The wick **44** is resilient and flexible and capable of conforming to an extent to the surface of the ink storage element

in the pen when the ink storage element engages the wick and bears thereagainst. The ink lifting element or wick 44 is of essentially cylindrical cross section, being of course enabled to assume irregular shapes due to the resiliency thereof. The wick is inserted in the aperture 40 in a position in which its upper or outer end 46 projects into the tubular element 28 a short distance beyond the boss 42 terminating in or adjacent the lower end of the socket portion of the tubular element, and its lower or inner end extends toward the bottom of the reservoir, being preferably of such a length that its inner end will rest directly on the bottom surface of the reservoir in the normal position of the base. The capillary capacity of the wick is sufficient to lift the ink to its upper end from the extreme bottom portion of the reservoir when the ink level drops that low. The wick may be of a normal diameter slightly larger than the aperture 40, being compressed for the purpose of inserting it in the aperture after which it tends to reassume its original dimension and engage the surface of the aperture to retain it in the desired and adjusted position. The outer end 46 of the wick is enabled to spread due to the inherent tendency thereof to do so and also due to the influence of the pen to spread it when the pen is in place in the socket and resting thereon, as will be referred to later.

Since the aperture 40 is centrally disposed with respect to the pen retainer 26, the wick 44 when mounted in the aperture 40 is disposed concentric with the socket 43, having a space therearound for the desired cooperation with the ink storage element in the pen, whereby when the ink storage element engages the end surface of the wick, the writing tip of the pen nib is enabled to enter the space around the wick in any angular position of the pen about its longitudinal axis, as will be brought out more fully later.

The outer end 46 of the wick, being projected as it is slightly beyond the outer end of the boss 42, has a peripheral portion exposed to enable full capillary contact engagement between itself and the ink storage element in the pen, as also will be referred to later. The boss 42 is of lesser external diameter at its greatest dimension than the inner diameter of the tubular member 28 and this feature, together with the exposed peripheral portion of the end 46 of the wick, defines a peripherally continuous annular space 48, referred to above, the space surrounding not only the inner end portion of the wick, but the boss as well, for reception of the writing tip of the pen nib when the pen is inserted in the socket. Thus, as pointed out above, regardless of the angular position of rotation of the pen about its longitudinal axis, the writing tip of the pen nib projects into the space 48 inwardly beyond the outer end 46 of the wick. Any danger of damaging the writing tip by clashing with elements of the pen retainer is thereby eliminated. The lower or inner end of the tubular element 28 is preferably disposed substantially perpendicular to the axis thereof, so that the space 48 is of constant depth axially of the tubular element at all points therearound, whereby the writing tip will be fully accommodated in any portion of the space. In any event, all portions of the space should be of axial dimension at least great enough to accommodate the writing tip of the pen nib.

The pen 50 constituting a part of the pen desk set includes a body 52, the rearward portion of which may be solid and long and tapered, as is customary with pens utilized in pen desk sets, although any particular shape of that portion of the pen is not essential. The pen 50 may be of any desired material such as metal or plastic. The outer surface of the foward end portion 54 of the pen is preferably substantially cylindrical, and substantially complementary in shape to the inner surface of the tubular element 28. The pen is adapted for insertion into the socket 43 to that position in which it engages the inner end 46 of the wick or ink lifting element which is preferably positioned so as to serve as a limiting stop for the pen.

For the purpose of mounting the capillary ink storage element in the pen body, the forward end of the body 52 is provided with a cavity 56 that is essentially cylindrical in shape, although it may have certain cutout portions of minor radial dimension for receiving the pen nib, as will be referred to later. The extreme forward end of the pen is diagonally disposed, forming a diagonally disposed forward opening of the cavity 56 and defining a forward hood-like portion 58 adapted to substantially enclose the writing nib hereinafter described.

Mounted and secured in the cavity 56 is a capillary ink storage element 62 having a cylindrical surface for engaging the surface of the cavity 56 and the pen nib 64. The ink storage element 62 may be composed of any of a number of materials, such, for example, as yieldable, resilient, regenerated cellulose sponge, of the character disclosed in the copending application of Robert W. Randolph, Serial No. 224,123, filed May 2, 1951. Alternatively, it may be composed of sintered metal of the character disclosed in the copending application of Ernst W. Rickmeyer, Serial No. 45,823, filed August 24, 1948. Briefly, the sintered metal of the Rickmeyer application referred to, is substantially rigid and inflexible. The metal contains innumerable pores of capillary dimension such as to be capable of lifting ink into the element when the element is brought into capillary contact with the ink. The outer end of the ink storage element 62 is also diagonally disposed, roughly coinciding with the diagonal contour of the open end of the cavity, but is rounded to a convex surface 66 extending slightly outwardly beyond the open end of the cavity.

The pen nib 64 may be of any preferred type, such as one arcuate in cross section and having a body 66 of substantial circumferential extent forming the greater part of a tube. The cavity 56 may have a cutout portion throughout the appropriate circumferential extent to receive the body of the nib, and a longitudinal rib for insertion between the side edges of the nib body 66, for retaining the nib in proper position. By reason of such construction the ink storage element 62 frictionally engages the pen nib and the rib in the cavity, so that the ink storage element and the pen nib are retained in the cavity by frictional engagement therewith. The exact details of the pen nib do not constitute an essential of the present invention. The nib is provided with the usual pierce 68 and slit 70 forming a pair of nib sections, the outer ends of both of which constitute a writing tip 72. The nib preferably is coaxial with the pen body and the writing tip 72 thus is offset laterally relative to the longitudinal axis of the pen and on the side thereof adjacent the hood-like portion 58, extending longitudinally forwardly beyond the extreme forwardmost portion of the hood, as well as the ink storage element. The nib slit 70 is in capalliary ink feeding relation with the ink storage element. The ink storage element has a forwardly directed, exposed surface portion in line with the longitudinal axis of the pen for engagement with the inner end 46 of the capillary ink lifting element 44, the latter being coincident with the longitudinal axis of the socket 43 and thereby coincident with the longitudinal axis of the pen when the pen is in the socket.

When the pen is inserted in the socket in the position illustrated in Fig. 1, it is placed in the position where the forward end of the ink storage element engages the outer end of the wick or ink lifting element, and the writing tip 72 extends into the space 48 surrounding the outer end of the ink lifting element and the boss 42. The space 48 is peripherally continuous, as mentioned above, so that the pen may be turned to any angular position about its longitudinal axis and in any such position the writing tip 72 is enabled to extend into the space 48. Furthermore, since the ink lifting element and the ink storage element have portions disposed coincident with

the longitudinal axis of the pen when the pen is in place in the socket, the two capillary elements will have mutual capillary engagement in all positions of the pen. It is therefore unnecessary for the user to first determine that the pen is in a certain predetermined angular position before inserting it in the socket, but he may insert it in any angular position with full assurance that the desired capillary engagement is established between the ink lifting element and the ink storage element.

The pen on coming into engagement with the wick or ink lifting element **44** tends to spread the outer end **46** thereof. This spreading action causes the outer end **46** to be spread over the edge of the boss **42** creating an additional means for retaining the ink lifting element in the aperture **40**. The inclination of the tubular element **28** and socket therein enables the pen to bear or rest on the ink lifting element by the force of gravity.

As mentioned above, the reservoir is preferably not filled beyond a level such as referred to above, so as to eliminate or minimize the tendency for ink to flow in quantities into the interior of the tubular element **28** so that the inner end of the pen, when the pen is in place in the base, does not extend into a body of ink.

The embodiment of the invention illustrated in Fig. 2 differs from that of Fig. 1 principally in that the former includes an ink storage element in the pen with a cavity therein for receiving a portion of the ink lifting element whereby a substantially greater capillary transfer area exists between the two capillary elements. In Fig. 2 the reservoir **12** may be identical with that of Fig. 1 and the pen retainer **74** includes a tubular element **76** differing from the tubular element **28** in that the element **76** has an opening at its inner end of the same diameter as that of the tubular element itself. The ink lifting element **78** is preferably rigid and may be of sintered metal of the character disclosed in the Rickmeyer application above referred to, and includes an inner relatively large cylindrical portion **80** friction-fitted, for example, in the inner end of the tubular element **76**. The ink lifting element includes an upper or outwardly extending reduced diameter portion **82** also of cylindrical shape and extending a substantial distance into the socket portion **84** of the tubular element **76** centrally thereof and coincident with the longitudinal axis of the socket. The reduced portion **82** has an exposed surface on its outer end as well as on its periphery, for engagement with the inner surface of the cavity in the ink storage element of the pen. In this case similarly to that described in connection with Fig. 1 there is a space **86** between the reduced portion **82** and the tubular portion **76** peripherally continuous and surrounding the portion **82**.

The pen **88** includes a body **90** similar to the body **52** and is provided with a cavity **92** for receiving the ink storage element **94** and the nib **96**. The ink storage element **94** is also preferably rigid, and may be composed of sintered metal of the type above referred to, and is provided with a forwardly opening cavity **98** of cylindrical cross section complementary to the reduced portion **82** of the ink lifting element.

The nib **96** may be similar to the nib **64** and the ink storage element and nib may be mounted in the cavity **92** in a manner similar to that described in connection with Fig. 1.

When the pen **88** is inserted in the socket **84**, the cavity **98** in the ink storage element therein receives the reduced portion **82** of the ink lifting element and there is accordingly mutual capillary ink transfer engagement between the two capillary elements throughout the inner surface of the cavity **98**.

Accordingly rapid transfer of ink from the ink lifting element to the ink storage element is effected whereby the ink storage element becomes rapidly filled and it is not necessary that the pen be in the socket for any appreciable time for the ink storage element to be filled. As in the previous embodiment, the pen **88** may be turned in any angular position about its longitudinal axis and the intended capillary contact engagement between the two capillary elements is established. The space **86** enables the writing tip of the nib to extend thereinto for enabling full insertion of the pen into the socket and into position for full capillary contact engagement between the two capillary elements.

The embodiment of the invention illustrated in Figs. 3 and 4 includes, in common with that of Fig. 2, that feature whereby the ink storage element in the pen has a cavity for receiving a portion of the ink lifting element in the base. In Fig. 3 the reservoir **16** may be identical with that of Fig. 1 and the pen retainer **100** includes a tubular element **102** having a bore portion **104** at its inner end in which the ink lifting element **106** is mounted and may be held as by friction. The ink lifting element in the present instance likewise is preferably rigid and may be sintered metal, of the character above referred to, and includes a lower or inner portion **108** of cylindrical form and constituting that portion which engages the bore **104**. Extending upwardly or outwardly from the portion **108** is a reduced diameter portion **110**, of tapered shape and diminishing in diameter outwardly of the tubular element **102**. The portion **110** is disposed centrally of the socket **112**, coincident with the longitudinal axis of the tubular element **102** and the socket therein. The socket **112** is provided with a plurality of longitudinally extending, circumferentially spaced ribs **114** for engagement by the pen **116**, providing for passages between the pen body and the wall of the socket so as to eliminate pumping action of the ink when the pen is inserted in and removed from the socket.

The pen **116** has a cavity **118** opening forwardly of the pen in which is mounted a capillary ink storage element **120** preferably rigid and composed of sintered metal of the nature above referred to. The ink storage element **120** is provided with a forwardly opening cavity **122** of tapered shape complementary to the shape of the extension **110** of the ink lifting element. The pen **116** is also provided with the usual nib **124** which may be generally similar to either of those above described and fitted in the cavity **118** with the ink storage element in such a way that both the nib and ink storage element are retained in the cavity by friction engagement therewith. A rib **125** is formed in the cavity **118** for engaging the side edges in the nib body, in a manner similar to that referred to in connection with Fig. 1.

As in both the previous embodiments the user need not take any precaution for positioning the pen in any predetermined angular position in order that the desired capillary contact engagement be established between the two capillary elements.

The relative dimensions of the pen **116** and ribs **114** are preferably such as to permit the pen to be inserted into the socket to such an extent that the reduced portion **110** is fully received in the cavity **122** without the ribs acting to limit the movement of the pen before that position is reached.

I claim:

1. In a capillary pen desk set, a base having a reservoir and an opening from the reservoir to the exterior, a tubular element mounted in said opening, said tubular element defining a socket in its outer portion and having a reduced dimension aperture in its inner end surrounded by an annular boss extending into the tubular element, said annular boss being of lesser transverse dimension than said tubular element, a flexible capillary wick mounted in said aperture with its inner end extending into the reservoir and its outer end extending a relatively short distance outwardly beyond said annular boss, and a pin having a cavity in its forward end and a substantially rigid capillary ink storage element in the cavity with an exposed forward end portion substantially in line with the longitudinal axis of the pen and having a substantial transverse component, and a writing nib in said cavity in capillary feed engagement with the ink

storage element, said writing nib having a writing point laterally offset from said longitudinal axis and extending forwardly beyond the ink storage element, said pen and tubular element being relatively dimensioned for insertion of the pen in the socket in position wherein the exposed portion of the ink storage element engages the outer end portion of the wick.

2. In a capillary pen desk set, a base having a reservoir and an opening from the reservoir to the exterior, a tubular element mounted in said opening defining a socket in its outer portion and having a reduced dimension aperture in its inner end surrounded by an annular boss extending into the tubular element, a flexible capillary wick mounted in said aperture with its inner end extending into the reservoir and its outer end extending a relatively short distance into the tubular element outwardly beyond said annular boss, and a pen having a cavity in its forward end with an inclined opening and a substantially rigid capillary ink storage element in the cavity with an exposed forward end surface of substantial area extending across the longitudinal axis of the pen inclined substantially complementally to the opening of the cavity, and a writing nib in the cavity in ink feeding relation to the ink storage element and having a writing tip laterally offset from said longitudinal axis on the side thereof adjacent the forwardmost portion of the ink storage element and extending forwardly therebeyond.

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